STATEMENT OF JOHN C. BROWNE, DIRECTOR

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COMMITTEE ON ARMED SERVICES

SUBCOMMITTEE ON MILITARY PROCUREMENT

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INTRODUCTION

Thank you, Mr. Chairman and distinguished members of the Military Procurement Subcommittee of the House Armed Services Committee, for the opportunity to submit this report on the status of our science-based Stockpile Stewardship Program at Los Alamos National Laboratory.

In 1995 the U.S. Government initiated the stockpile stewardship program to ensure the safety, reliability and performance of the nuclear stockpile in the absence of nuclear testing. This program, which constitutes the core mission of our Laboratory, presents one of the most difficult technical challenges this nation has ever faced. In this testimony I will present the status of the program, accomplishments to date, and challenges for the future.

Let me begin by saying that I am more encouraged today by our ability to address and resolve stockpile issues than I have been in the past. Based on our progress and accomplishments to date, if we continue on the present path I believe we can reverse a perceived decline in confidence. We have had notable successes in the recent past -- in manufacturing pits, in developing the experimental and simulation tools and methodologies that help us better understand weapons performance, and in developing a certification methodology. This progress gives me renewed hope in our ability to meet present and future challenges to our stockpile. The attached appendix summarizes highlights of our recent accomplishments. The following are a few examples:

> Pit Manufacturing and Certification: We have made great strides in recapturing this capability for the nation. We are on schedule to deliver a certifiable W88 pit in April 2003, and we have fabricated a total of 13 pits, 6 more than our planned baseline schedule of 7.
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> Life Extension Programs: Projects to extend the life of the W76 and B61-7 and -11 are proceeding on schedule. We have completed the W80 Baseline program and continue to support knowledge transfer for the life extension of this system to Lawrence Livermore National Laboratory (LLNL).
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> Advanced Simulation and Computing: During this past year, we completed the first three-dimensional simulation of a full nuclear weapon system explosion using the LLNL 12 Teraops White computer that was directly relevant to the W76 Life Extension Program (LEP). We are installing the first phase of 10 Teraops of the 30 Teraops computer in our new Nicholas C. Metropolis Center for Modeling and Simulation that was completed ahead of schedule and $13M under its $106M budget.
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> Hydrodynamic Experiments: Completing the first axis of the Dual Axis-Radiographic Hydro-Test (DARHT) facility enabled us to perform hydrodynamic tests of nuclear weapon primary systems with outstanding spatial resolution. Since mid-FY01, we have performed seven major hydro-tests, four at DARHT,

directly related to stockpile systems and in support of certification activities. The second axis of DARHT will be completed this calendar year and will be fully operational in 2004. Proton radiography is a new technology being developed at our LANSCE facility that is helping us make decisions about the stockpile and portending great promise for a future Advanced Hydrodynamic Facility (AHF).

Certification Methodology: In the past year, Los Alamos and Livermore reached agreement on an approach to certification and quantifying margin and uncertainty (QMU) that will allow a better understanding of the confidence for any given nuclear weapon. We have begun to apply this methodology to this year's certification process.

The ability of the NNSA defense complex infrastructure to maintain the stockpile will depend, in part, on the viability of today's production capacity and capabilities to meet current and future needs, e.g., to find and address problems through enhanced surveillance, to extend weapon system lifetimes, and to produce weapons modifications required to meet new Department of Defense (DoD) requirements. The nuclear facilities and infrastructure at Los Alamos -- buildings, roads, sewer systems, and the electrical power grid -- are approaching fifty years old and are deteriorating at an alarming rate. The dedicated revitalization effort being planned by NNSA is crucial for the long-term viability of Los Alamos National Laboratory, as well as for other facilities in the nuclear weapons complex.

But the effectiveness of the defense infrastructure to maintain the stockpile depends on more than our capacity for production. A production capability depends on our ability to understand the performance of weapons. We cannot, for example, produce and certify nuclear pits without a better, scientific understanding of weapons performance. This science-based approach to stockpile stewardship allows us to make critical decisions about the stockpile, including whether or not nuclear testing is required to resolve a technical issue. This also includes resolving Significant Finding Investigations (SFI's), performing life extensions, and assessing the health of the stockpile annually. I am concerned that we are cutting too deeply into an investment in the predictive science that will prevent us from making wrong or untimely decisions. This investment must not be deferred. Failure, even temporarily, to maintain appropriate levels of investment in experimental and diagnostic facilities and equipment risks creating vulnerabilities from which we might not be able to recover as quickly as might be necessary.

Additionally, we must find ways to assure the Congress of appropriate accountability and transparency in our programs without resorting to Congressional language that would force us to ask permission before beginning even preliminary investigation of advanced concepts. The flexibility to pursue advanced concepts in a manner consistent with established processes of scientific inquiry is important to assuring that we can address new requirements for the U.S. nuclear deterrent, and avoid technological surprise with new or unanticipated developments. Flexibility is equally important in allowing us to exercise the scientific and technical expertise of weapons designers, especially those who do not have nuclear test experience.

Finally, we support the steps that NNSA is taking to streamline operational oversight, encourage and support cooperation among its contractors, and to focus its efforts on strategic priorities and planning for the future. This should help us accomplish our mission and achieve programmatic success in a cost-effective and efficient manner, and in a way that allows us to meet near-term requirements as well as evolving, long-term challenges.

STOCKPILE STEWARDSHIP

In 1995, the Department of Energy and the nuclear weapons complex implemented a science-based stockpile stewardship program to sustain the nuclear warheads in the enduring stockpile. The goal was to maintain the certification basis of these warheads without the need for nuclear testing. This was, and remains, an extremely ambitious goal. Ultimately, as I have said previously, in the absence of nuclear testing we cannot guarantee success of the stockpile stewardship program.

Annual Assessment Process

Since 1995, there has been an annual process established to assess the safety, reliability and performance of the nuclear weapons stockpile. This process requires the Laboratory Director to formally certify the current health -- safety, reliability, and performance -- of the warheads designed and built by the Laboratory in a letter to the Secretaries of Defense and Energy. The Director must also state whether nuclear testing is required to resolve any issues that might exist for a weapon. This is my most important responsibility as Laboratory Director. The process must be a well-structured one that assures integrity in the assessments and reviews.

There is specific language in section 3144 of the Defense Authorization Bill that would mandate "red teams" to perform peer reviews and require that "red team" reports be included as part of an annual certification package to the President and to Congress. Although I support "red teams", I am concerned that this language will lead to new external committees to "resolve" highly technical issues that should be addressed at the level of the Laboratory Director. I am equally concerned that an expanded process would inevitably lead to accountability without authority for the Laboratory Director. Annual assessment must be a process in which the Laboratory Director -- not a computer code, not a red team member, not a committee -- makes the final technical judgment on certification of the weapons under his/her responsibility. This decision is clearly based on the input of all the experts that have knowledge and input into the certification process. The accountability inherent in this process is an essential element; expanding this accountability to committees or to a group of external experts would be a move in the wrong direction.

We have strengthened our assessment approach each year since beginning this process. We now have an excellent, although not completely adequate, set of tools that we have used in our experiments and simulations to yield data that have improved our comprehension of weapons performance. We have improved our methodology for certification. Both Los Alamos and Livermore support rigorous inter-laboratory peer review to ensure that issues with potential serious consequence for warhead performance and safety are properly identified, addressed and resolved. In the past year, the two laboratories reached agreement on a quantitative approach for certification that utilizes similar methodologies while maintaining independence for peer review purposes. Consistent with recommendations from the Foster Panel report, we have been phasing in "red teams" or "fresh-eye teams" at Los Alamos designed to look for any issues that might have been overlooked by the responsible warhead design/refurbishment team. A "red team" of LANL senior scientists, reporting directly to me, was established last year to review our annual assessment and will do so again this year. I use the team's report, and that of the responsible warhead team, in my annual assessment of the stockpile.

A major refurbishment of a weapon system, such as the B61-11, requires a certification process that is equivalent to a certification of a new weapon system. Therefore, the time scale is longer and involves a more elaborate process, potentially involving multiple peer reviews over time.

Also, as currently worded, legislative language in section 3144 would significantly change the thrust of the annual assessment process by expanding the scope of the Laboratory Directors' responsibilities to include, for example, assessments of warheads for which they are not responsible, of nuclear weapons production plant capabilities, and of the relative merits of alternative warheads. Requiring such an expansion of scope would require the Laboratory Directors to undertake assessments that are correctly the purview of other NNSA and DoD organizations and for which their respective Laboratories are not always adequately informed. I do not believe that this necessarily would serve the needs of the nation.

Finally, Section 3144 includes language that would require me to discuss the relative merits of other weapon types that could accomplish the mission of a weapon type I am certifying. This would usurp the role and responsibilities of the Nuclear Weapons Council, created by Congress to have broad responsibilities with respect to oversight of the stockpile stewardship program, and would be inappropriate. This language also fails to recognize the joint nature of the stockpile certification process conducted by the DoD and the NNSA.

Pit Manufacturing and Certification

One of our highest priorities at Los Alamos National Laboratory is to re-establish the nation's capability to manufacture plutonium pits, the heart of nuclear weapons. Re-establishing this capability is an extremely complicated technical process that involves a combination of proven technologies that were used at Rocky Flats and new technologies needed to replace technologies no longer available. The W88 pit has been selected as the crucial prototype for restoring the nation's nuclear pit manufacturing capability. Producing a pit for a nuclear weapon involves two distinct but intertwined activities: manufacturing and certification. Significant progress in this program has been made in this last year. We are well along in establishing a limited manufacturing capacity for pits.

To date, Los Alamos has completed thirteen pits, well exceeding its planned target of seven. Of those thirteen, eight pits have been used to qualify manufacturing processes to meet the Design Agency specifications. We are on schedule to deliver a certifiable W88 pit, defined as one that meets all manufacturing requirements and specifications, by April 2003. We also are beginning to develop advanced manufacturing technologies in order to establish our capability to remanufacture stockpile pit designs other than the W88.

Certification of the pit is an extremely challenging process that requires both highly specialized equipment and expertise. Los Alamos has identified a series of laboratory and sub-critical experiments that are designed to test and validate our computer simulations that will be needed to ensure that the pit will perform as designed. Based on improved planning and better certification methodology we have been able to accelerate our schedule for certifying these pits for stockpile deployment use from the previously scheduled date of 2009 to 2007. LLNL is engaged in our plan to peer review the certification of the W88 pit.

Directed Stockpile Work

This work encompasses a broad range of activities that support the maintenance, safety, reliability, and performance of the nuclear weapons in the stockpile without the benefit of underground testing.

Life Extension Programs (LEPs): The life extension of the Navy's W76 system is proceeding on schedule toward a first production unit in 2007 with an estimated initial operational capability of April 2008. Evaluation of the condition and life expectancy of the materials in the nuclear explosive package is being addressed. The warhead refurbishment will extend the lifetime of this system for thirty years. We also have finalized plans with NNSA, Pantex, and Y-12 to begin refurbishing canned secondary subassemblies of the B61 Mod 7 and 11 in 2006. External peer reviews are being conducted, and final decisions to remake or reuse certain components are being made.

In support of the W80 Life Extension Program being conducted by LLNL, we are developing the Acorn gas transfer system with Sandia National Laboratories-California. We also have completed the W80 Baseline program and continue to support knowledge transfer to Livermore for their use in the life extension of this system.

Surveillance/Significant Finding Investigations (SFI's): In the course of our surveillance activities, when any condition not in accordance with the original design is noted in a warhead, an SFI is initiated to manage the investigation, assessment, resolution and reporting of that condition. These conditions result from production defects, deviations from design intent and aging of the warhead. In every instance, the Laboratory determines if there is any impact to warhead safety, reliability, or performance, using the available suite of diagnostic, computational, and assessment tools. Safety-related SFI's always receive the highest priority. Once an SFI priority has been determined, those deemed to have the most critical impact are assigned high priority and an investigation is initiated immediately to determine the cause of the condition and to conduct the necessary research, testing and analyses. Depending on their potential impact to reliability and performance, work on the remaining SFI's is prioritized with other, ongoing stockpile activities. The opening of an SFI is not intended to signify the seriousness of the impact on the safety, reliability or performance of the warhead.

There are some SFI's that have been open for more than one year, either because they involve complex, highly technical issues that require additional time, or because of the technical challenge of resolving these issues with our current tools and methodologies. The Laboratory is working vigorously, with the tools and methodologies that we currently have available, to resolve problems identified in our remaining open SFI's. Support for the ongoing development of these tools and capabilities is vital to ensuring that SFI's are resolved in a timely manner, and that decisions about stockpile maintenance activities are both informed and effective**.**

The annual assessment process requires me to examine all open SFI's to ensure that there are no issues that would lead me to recommend resumption of nuclear testing, changes in the operating conditions for a weapon, or withdrawal of a system from the stockpile. As our diagnostic tools improve, we expect to discover more issues that may result in SFI's. Also, the aging of our weapons and the dynamic nature of nuclear materials will cause changes that we will want to note and that are also likely to result in SFI's. However, this does not imply that I am losing confidence in the stockpile. If we could not resolve an SFI without some action by the NNSA or the DoD, I certainly would inform them of that situation.

As part of an enhanced surveillance program, Los Alamos is developing several promising technologies and techniques that have the potential for providing advanced warning of stockpile issues resulting from manufacturing or aging defects prior to their occurring in the field. Also, Los Alamos has been and is working with rest of the DOE Weapons Complex to develop an integrated surveillance program, one that contains increased technical rigor and consistency to support assessments regarding the safety, reliability, and/or performance of our aging stockpile. This more formalized approach will also include a way of communicating the seriousness of the potential impact of SFI's while they are still under investigation.

Predictive Science

Since the cessation of U.S. nuclear testing in 1992, we have used a science-based stewardship approach to provide new assessment and predictive tools required for continued confidence in the safety, reliability and performance of the nation's stockpile. Today, the requirements for such confidence, the ability to provide a more agile capability, and the knowledge to avoid technological surprise remain as national priorities. Our success hinges on the timely development of a predictive capability we can rely on, scientifically, for future certification without further nuclear testing.

We must be able to evaluate, at any given time, how any issue uncovered in the stockpile, or any change that we might consider, will affect system safety, reliability and performance. If we do not have reliable models, codes, and data to develop an understanding of the issue through validated simulations, we will potentially make decisions that are costly and that may not, in fact, achieve the desired result of maintaining or improving performance. I am increasingly concerned that we are cutting too deeply in the predictive science part of the program. This will jeopardize our ability to quantify performance and, hence, decrease confidence in our assessments.

Notwithstanding my concerns about sustaining our investment, we have made great strides in building predictive capability. For example, we now have computer hardware and new codes that offer astonishingly high-resolution simulations of our systems from initiation to nuclear yield and we are using these to tackle and resolve real stockpile issues. During this past year, we completed the first three-dimensional simulation of a full W76 nuclear weapon system explosion using the LLNL 12 Teraops White computer. This calculation represents the first time that we have been able to compute a fully coupled primary and secondary explosion to analyze weapon performance. It represents a breakthrough for the program and unprecedented detail for designers and analysts. However, as powerful as these codes are, they are not yet fully validated in that we recognize the need to embed better theory and models in key areas where we know that our predictive capability is as yet inadequate.

We are installing the first phase of 10 Teraops of a 30 Teraops computer, called the "Q" computer, which was purchased as part of the Advanced Simulation Computing Program, an essential element of the nuclear weapons program. We are installing the full capability in phases in order to facilitate performance testing to connectivity requirements. The Q computer will provide the next increment of computing power required to run the new computational tools to support the Stockpile Stewardship Program mission. Baseline simulations of the weapon systems for which Los Alamos has responsibility will transition to the new ASC codes in the next few years. As this occurs, the demands on our simulation environment will be very severe as we support the heavy load of Direct Stockpile work currently scheduled for the next decade.

Hydrodynamic tests are another tool we use to enhance our predictive capability. These above ground tests provide integral data that are as close as we can get to a primary exploding without nuclear yield, and thus provide essential tests for our simulations. Another example of our progress in developing and using these tools is the completion of the first axis of the Dual-Axis Radiographic Hydro-Test (DARHT) facility. This has enabled us to perform hydrodynamic tests of nuclear weapon primary systems with outstanding spatial resolution of the imploding surrogate pit. Since mid-FY01, we have performed seven major hydro-tests, four at DARHT, directly related to stockpile systems and in support of certification activities. Following commissioning and optimization of the second axis of DARHT, the facility will provide an enhanced diagnostic capability in FY04. We are also continuing to develop proton radiography as an advanced capability in order to maintain our ability to certify the refurbished nuclear weapons, and to validate the predictive capabilities of next-generation designers.

While DARHT provides an enhanced diagnostic capability for today and will be the workhorse for the next decade, I believe that an Advanced Hydrodynamic Facility (AHF) will have unprecedented precision to test and validate primary theory, models and codes for the future. The AHF, which was specifically identified in the earliest chartering of the stewardship mission, will represent the most advanced dynamic radiographic facility in the world. It is currently envisioned that hydrodynamic experiments conducted at AHF would minimize the gap between above-ground non-nuclear experiments and the nuclear regime that is currently inaccessible to our weapon designers. These experiments would represent a focusing of all the predictive capability developed through stewardship and would validate our designers' abilities to predict, with greatest confidence, the nuclear performance of weapons. In short, AHF would represent the "last stop" taken by stewardship before technical issues would lead us to demanding a nuclear test.

I fully recognize and accept that any AHF must be justified by a valid mission need and that such justification must be rigorous. However, I am very concerned that current budget pressures for FY2003 may eliminate even the continued exploration of proton radiography. It is the most promising approach for an AHF, and is a precision tool that is beginning to have a role in qualifying the capabilities of the next generation of designers without testing. Without such exploration and development, the nation may lose the opportunity to capture what could be a vital predictive tool.

Test Readiness

The NPR has called for enhanced test readiness. The NNSA currently maintains a capability to field a nuclear test in 36 months, should a decision be made to do so, consistent with current policy requirements. Although we see no technical reason to do a nuclear test today, we support General Gordon's direction to reduce the timescale required to resume nuclear testing -- from 36 months to 18 months or less -- as a prudent measure. Should the nation move in this direction, we will plan with NNSA how best to achieve and maintain an enhanced posture so it maximizes the synergy with other, notably experimental, stockpile stewardship activities and training of new staff.

Any test readiness posture must be intimately tied to, and coordinated with, the national stewardship posture. Different types of tests require different amounts of preparation; furthermore, we should have some warning time if we are dealing with an aging problem. Therefore, different elements of a prudent test readiness posture will be tailored to whatever concern we are hedging against. Many of the diagnostics needed for an underground nuclear test can be prepared with above ground and sub-critical experiments. However, to enhance test readiness we need to ensure that personnel can successfully field a diagnosed test if needed, and that the necessary technologies and diagnostics are available. The aging of our test experts and our equipment, and a diminished capability to field various technologies have resulted in the steady erosion of the skills that underlie our test readiness ability. Consequently, much of what we need to do for an adequate test readiness posture must be built into our existing program and designed to enhance our skills in test capabilities. This includes actively applying certification methodology to ensure that we are continually prepared to provide the technical justification for any potential return to testing.

We currently support test readiness through a number of collaborations with the Nevada Test Site. The most prominent collaboration is that of sub-critical, non-yield, underground tests that address key dynamic materials issues and exercise the infrastructure required should a return to underground nuclear testing be needed. In

February, we conducted a successful collaborative sub-critical experiment in Nevada that yielded significant data. If nuclear testing were resumed, test events would be carefully designed and coordinated elements of an integrated test program to supplement the present Stockpile Stewardship Program, not to replace it.

ENABLING MISSION SUCCESS

People: Training a New Generation of Stockpile Stewards

A large number of nuclear weapons personnel at Los Alamos are nearing retirement, and it is critical that we effect the transfer of technical and programmatic knowledge that they embody. We are focusing our efforts to address the following issues:

- ♦ Attracting and retaining future stewards who will have no testing experience;
- ♦ Providing these future stewards with the validated predictive tools to qualify their design skills (intellectual responsiveness); and
- ♦ Revitalizing our infrastructure in a timeframe that permits us to provide sufficiently hospitable, modern, and well-equipped facilities.

The Role of Advanced Concepts: The Nuclear Posture Review identified a need for a flexible and responsive R&D infrastructure to address the changing threats to U.S. national security. This includes the study of advanced concepts that could meet DoD's weapon requirements in the future. These studies could include new and extended concepts -- those that may have been developed and tested in the past, but not deployed. The NNSA's Advanced Concepts Initiative articulates a strategy for providing nuclear options for deterrence, integrating different nuclear warheads into existing nuclear weapon systems, transferring nuclear warhead design knowledge, and exercising design skills. This initiative provides an outstanding opportunity for the nuclear weapons complex to ensure that existing expertise is transferred to a future generation of stockpile stewards, and to extend the front-line weapons lifetimes beyond that of the designers who designed and tested them. We are firmly prepared to support and respond to this proposed initiative, but we will need explicit funding for the study of these advanced concepts if they proceed beyond the paper study phase.

Science: Achieving Program Balance and Scientific Diversity

As I have alluded to earlier, the biggest challenge facing the Stockpile Stewardship Program is developing a balanced stockpile stewardship program within the budgets provided by the Congress. The balance that must be struck is between stockpile surveillance and maintenance, manufacturing involved in life extension programs, infrastructure maintenance and re-capitalization, sustaining a preeminent capability in weapons-relevant science and experimentation, test readiness, and exploration of advanced concepts. The Future Years National Security Plan (FYNSP) that NNSA submitted to Congress this year is a good start toward providing a process for achieving this balance. At present, scientific investments are under stress due to the focus on the refurbishment of three weapons systems in the coming decade. The predictive assessment tools currently available to certify these planned LEPs are not yet adequate for the scope of these refurbishments. The addition of new production facilities, such as a modern pit facility, will add to that stress unless the future year budgets accommodate such large expenditures.

Much of the science and engineering that is critical to maintaining our stockpile stewardship capability is also the foundation of our efforts in threat reduction -- non-proliferation, counter-terrorism, homeland security and defense transformation. Consequently, in the aftermath of September 11, we were positioned to participate with NNSA and its other two laboratories, Sandia and Livermore National Laboratories, in efforts to defend the U.S. against nuclear, chemical, and biological terrorist attacks. NNSA has an important R&D role to play in the ongoing war on terrorism. Congress must ensure that there is adequate and sustained funding available to invest in both short and longer-term research and development for future contingencies with respect to threat reduction activities.

We also conduct use-directed basic research that is funded by our Laboratory Directed Research and Development (LDRD) program, and by the Department of Energy's other programs, such as the Office of Science programs. This research, which strengthens the technical capabilities needed for our core mission, and for our threat reduction and counter terrorism activities, allows us to maintain important relationships with universities, and serves as an essential tool in our recruitment efforts.

Facilities and Infrastructure: Revitalizing for Long-Term Viability
Deterioration of our 50-year old infrastructure and facilities is a serious challenge, which may serve to undermine our long-term ability to fulfill stockpile stewardship objectives. We are working with NNSA as part of the Facilities & Infrastructure Revitalization initiative to develop plans to improve our infrastructure. We have developed a Ten Year Comprehensive Site Plan that NNSA has approved as a guide for prioritizing maintenance and facility replacement at our site. In addition, I have chartered a strategic review of our facilities and infrastructure to determine where and how we might shrink our footprint for today's mission.

We presently have three major construction projects that either have finished or will finish significantly ahead of schedule and under budget, including the Nicholas C. Metropolis Center for Modeling and Simulation, which was dedicated in May 2002. This Center will serve as an integrating facility to bring the scientists and engineers, computing platforms, and visualization tools together to develop a robust predictive modeling and simulation capability that will be key to helping us gain insight and understanding of the behavior of weapons systems in the stockpile. It will also help attract and retain new scientists and engineers.

Notwithstanding these successes, our challenges in sustaining a dedicated revitalization effort are substantial. In particular, we need your support for the replacement of our 50-year-old Chemistry and Metallurgy Research (CMR) building. This reduced-scale replacement will be located within an Integrated Nuclear Complex at our TA-55 site. We strongly support General Gordon's 10-year Facilities and Infrastructure Revitalization Initiative. Congress provided an initial investment last year, but this will continue to be a critical issue in FY03 and the out years. Without your continuing and strong support of this initiative, we will not be able to sustain either the manufacturing or certification efforts for the stockpile.

Leadership: Managing our Future
NNSA has taken a number of steps to streamline and reorganize its internal operations in order to better meet mission requirements, to focus on achieving results, and to eliminate excessive micro-management. It has established an integrated program planning, budgeting and evaluation system (PPBES) to ensure links between long-range planning, budgeting and evaluation of results. This system allows for multi-year program plans that will be the basis of NNSA's implementation plans and metrics for program evaluation and contract performance agreements. To ensure consistency with NNSA, and to achieve maximal efficiency, Los Alamos has begun to implement a PPBES, closely aligned with the NNSA system.

In concert with these changes, NNSA has begun to clarify the roles and responsibilities of all segments of the organization and to develop initiatives to reduce the administrative burden on the program. NNSA also has articulated a new basic principle for contractor management and one that should serve to create positive and systemic change in the nature of the relationship between NNSA and its contractors. That principle, described in NNSA's February 25, 2002 Report to Congress, states that the fundamental role of NNSA is to define "what" is required and the fundamental role of the contractor is to develop "how" best to achieve NNSA's expectations. On the basis of that principle, and in accordance with an agreement reached by senior leadership at NNSA, the University of California (UC) and its two NNSA Laboratories are working together to develop a framework for a new governance model that NNSA can use to evaluate the corporate performance of UC and the Laboratories. NNSA, UC and the Laboratories have agreed on the need to improve the current contract performance process and to focus on a set of critical high-level goals, with specific objectives and measurable deliverables, to be agreed on by senior officials at NNSA and UC. We are optimistic about these changes and are anxious to work with the NNSA to accomplish our critical national security missions.

CONCLUSION

For more than a half a century, the nation's investments in Los Alamos have helped ensure our nation's security. Our country faces ongoing and new challenges -- global terrorism, evolution of nuclear deterrence with fewer deployed nuclear weapons, and certification of an aging stockpile without nuclear testing. Our Laboratory is committed to meeting these challenges to our nation's security.

In conclusion, I would like to thank you for your past support. Your continued support is critical to our ability to meet the technically demanding and vital national security challenges we face today and in the future.

APPENDIX

Recent Progress and Accomplishments: Highlights

Certification

- We have reached agreement with LLNL on a quantitative approach for certification that utilizes similar methodologies while maintaining independence for peer review purposes. We have begun to apply this methodology to this year's certification process.
- Consistent with recommendations from the Foster Panel report, we have been phasing in "red teams" or "fresh-eye" teams to look for issues that might have been overlooked by the responsible warhead design/refurbishment team. A "red team" of LANL senior scientists, reporting directly to the Laboratory Director, was established last year to review our annual assessment and will do so again this year.

Pit Manufacturing

- We are well along in establishing a limited manufacturing capacity for pits. To date, Los Alamos has fabricated a total of 13 pits, well exceeding its planned target of 7. Of those thirteen, 8 were developmental and 5 were standard.
- We are on schedule to deliver a certifiable W88 pit by April 2003. Our pit manufacturing baseline has now been documented and approved.
- Based on improved planning and better certification methodology we have been able to accelerate our schedule for certifying these pits for stockpile deployment use from the previously scheduled date of 2009 to 2007.
- We are beginning to develop advanced manufacturing technologies in order to establish our capability to remanufacture stockpile pit designs other than the W88.

Directed Stockpile Work

- The life extension of the Navy's W76 system is proceeding on schedule toward a first production unit in 2007 with an estimated initial operational capability of April 2008. The warhead refurbishment will extend the lifetime of this system for 30 years.
- We have finalized plans with NNSA, Pantex, and Y-12 to begin refurbishing canned secondary subassemblies of the B61 Mod 7 and 11 in 2006. External peer reviews are being conducted, and final decisions to remake or reuse certain components are being made.
- In support of the W80 life extension program conducted by LLNL, we are developing the Acorn gas transfer system with Sandia National Laboratories. We have also completed the W80 baseline program and continue to support knowledge transfer to Livermore for their use in the life extension of this system.
- Through an enhanced surveillance program, we have several promising technologies and techniques that have the potential to provide advanced warning of stockpile issues resulting from manufacturing or aging defects prior to their occurring in the field. For example, we have prepared our first alloy containing Plutonium-238 to

study the effects of accelerated aging. Within four years, this material will reach an equivalent age of 60 years. At that time we will undertake extensive measurements to confirm our models of plutonium aging. This information is critical in the assessment of pit lifetimes.

- We are also working with rest of the DOE Weapons Complex to develop an integrated surveillance program, one that contains increased technical rigor and consistency to support assessments regarding the safety, reliability, and/or performance of our aging stockpile. This more formalized approach will also include a way of communicating the seriousness of the potential impact of SFI's while they are still under investigation.

Predictive Science

- During this past year, we completed the first three-dimensional simulation of a full W76 nuclear weapon system explosion using the LLNL 12 Teraops White computer. This calculation represents the first time that we have been able to compute a fully coupled primary and secondary explosion to analyze weapon performance.
- We are installing the first phase of 10 Teraops of a 30 Teraops computer, called the "Q" computer, purchased for the Advanced Simulation Computing Program. The Q computer will provide the next increment in the computing power required to run the new computational tools to support the stockpile stewardship mission.
- In May 2002 we dedicated the Nicholas C. Metropolis Center for Modeling and Simulation. The center was finished significantly ahead of schedule and under its budget of $106M by $13M.
- Los Alamos has completed the first axis of the Dual-Axis Radiographic Hydro-test (DARHT) facility. Since mid-FY01, we have performed seven major hydro-tests, four at DARHT, directly related to stockpile systems and in support of certification activities.

Threat Reduction

- Our pioneering work on sequencing the Human Genome helped grow a unique bioscience base that allowed us, in the aftermath of September 11, to play a key role in analyzing DNA of anthrax samples from the mail attacks.
- With Livermore, we deployed a biological agent detection system at the Salt Lake City Olympics.
- The Multi-spectral Thermal Imager (MTI) satellite, developed by Los Alamos in a joint project with Sandia National Laboratories, was re-deployed to help analyze the destruction and the dispersal of potentially harmful debris from the attacks on the World Trade Center.
- We currently are working with Sandia to develop a critical infrastructure analysis capability, which derives from an innovative simulation and modeling approach originally developed for understanding and improving large-scale transportation networks. The National Infrastructure Simulation and Analysis Center (NISAC) will use this approach for government planning and analysis of vulnerabilities and responses to terrorist attacks.

- We continue to provide the nation, and have done for over 25 years, with special equipment and expertise in addressing threats of stolen or improvised nuclear devices.
- We are working, and have been since the early 90's, to help secure vulnerable nuclear materials in Russia. For decades we have supplied technologies to help the International Atomic Energy Agency and other governments control nuclear materials.